federal register

Wednesday
May 13, 1992

Part III

Department of the Interior

Fish and Wildlife Service

50 CFR Part 17

Endangered and Threatened Wildlife and Plants; Determination of Endangered Status; Rules

DEPARTMENT OF THE INTERIOR

Fish and Wildlife Service

50 CFR Part 17

RIN 1018-AB52

Endangered and Threatened Wildlife and Plants; Determination of Endangered Status for Six Plants From the Kokee Region, Island of Kauai, Hawaii

AGENCY: Fish and Wildlife Service, Interior.

ACTION: Final rule.

SUMMARY: The U.S. Fish and Wildlife Service (Service) determines six plants, *Chamaesyce halemanui* (no common name (NCN)), *Dubautia latifolia* (NCN), *Poa sandvicensis* (Hawaiian bluegrass), *Poa siphonoglossa (NCN), Stenogyne campanulata* (NCN), and *Xylosma crenatum* (NCN), to be endangered pursuant to the Endangered Species Act of 1973, as amended (Act). These species are known only from the Kokee region of the island of Kauai, Hawaii. The six species have been variously affected and are threatened by one or more of the following: Habitat degradation by feral animals; competition for space, light, nutrients, and/or water from alien plant species; road or trail maintenance activities; and an increased potential for extinction and/or reduced reproductive vigor from stochastic events because of the small numbers of extant individuals and their restricted distributions. This rule implements the protection and recovery provisions provided by the Act for these plants.

EFFECTIVE DATE: June 12, 1992.

ADDRESSES: The complete file for this rule is available for public inspection, by appointment, during normal business hours at the U.S. Fish and Wildlife Service, 300 Ala Moana Boulevard, room 6307, Honolulu, Hawaii 96813.

FOR FURTHER INFORMATION CONTACT: Joan E. Canfield, at the above address (808/541-2749 or FTS 551-2749).

SUPPLEMENTARY INFORMATION:

Background

The island of Kauai is 627 square miles (sq mi) (1,624 sq kilometers (km)) in area (Armstrong 1983). The island was formed about six million years ago by a single shield volcano, whose caldera was 9 to 12 mi (15 to 20 km) in diameter, the largest caldera in the Hawaiian Islands (Macdonald *et al.* 1983). The remains of this caldera now extend about 10 mi (16 km) in length, forming the Alakai Swamp, an extremely wet, elevated tableland. Faulting and erosion on the western side of the Alakai Swamp have carved the deeply dissected Waimea Canyon, 10 mi (16 km) long and 1 mi (1.6 km) wide, its near-vertical cliffs well over 2,000 feet (ft) (600 meters (m)) high. The distribution of the six species in this final rule centers at Kokee, which lies just above the northern reaches of Waimea Canyon, with the wet Alakai Swamp to the east, steep cliffs of the Na Pali coast to the north, and drier leeward ridges to the west. Kokee is not a strictly defined area; in this document, "Kokee" refers to the boundary of Kokee State Park, roughly 8 sq mi (20 sq km) in area. To most conveniently delimit the greater part of the range of these species, "Kokee region" used here refers to the uplands (above 3,500 ft (1,070 m)) surrounding upper Waimea Canyon: on the west side of Waimea Canyon from Kauhao Valley northeast to the rim of Kalalau Valley, and south to Kohua Ridge on the canyon's east side, an area of about 15 sq mi (40 sq km).

The historical range of the six species in this final rule included leeward slopes on the west side of Waimea Canyon as far south as Lapa Ridge, north to the rim of Kalalau Valley, and on the east side of Waimea Canyon as far south as Olokele Canyon. That area is approximately 9 by 7 mi (14 by 11 km) in size, with plant localities ranging from 2,200 to 3,900 ft (670 to 1,190 m) in elevation. The currently known range of these species differs primarily from the historical range only on the east side of Waimea Canyon, where Kohua Ridge is now the southernmost locality. The present range is circumscribed by an area 5 by 6 mi (8 by 10 km), from 2,500 to 3,900 ft (760 to 1,190 m) in elevation, although most localities are above 3,500 ft (1,070 m). Hence, the range of these species may have been reduced by almost 50 percent.

In the Kokee region, the annual rainfall ranges from about 45 to 80 inches (in) (115 to 200 centimeters (cm)), with a sharp orographic gradient increasing to the east. The average annual temperature is about 62° F (17° C) (Armstrong 1983). These six species are primarily found on well drained, gently sloping to very steep, silty clay loam (Foote *et al.* 1972). The vegetation of the Kokee region is primarily mesic to wet forests dominated by 'ohi'a (*Metrosideros polymorpha*) and koa (*Acacia koa*). Because of the island's age, abrupt topography, and sharp climatic gradient, the native flora of the Kokee region is quite diverse, with a high proportion of locally endemic species.

Discussion of the Six Species

Chamaesyce halemanui was first collected in 1840 on Kauai by the U.S. South Pacific Exploring Expedition (Degener and Degener 1959b). In 1936, Edward Sherff named that specimen *Euphorbia remyi* var. *wilkesii*, and also named specimens from one collection from the Halemanu drainage both *E. halemanui* and *E. remyi* var. *leptopoda* (Koutnik 1987). Otto and Isa Degener and L. Croizat (Degener and Croizat 1936; Degener and Degener 1959a, 1959b) transferred all of those names to the genus *Chamaesyce*. In 1987, Daryl Koutnik reduced the two varieties listed above, and *E. remyi* var. *molesta* (Sherff 1938), to synonymy under *Chamaesyce halemanui*.

All collections and confirmed sightings of this species are from seven areas: Kauhao and Makaha valleys in Na Pali-Kona Forest Reserve; Mahanaloa Valley in Kuia Natural Area Reserve; the Halemanu drainage and near Waipoo Falls and Kokee Ranger Station in Kokee State Park; and Olokele Canyon on privately owned land (Hawaii Heritage Program (HHP) 1990a to 1990f). *Chamaesyce halemanui* is known to be extant at the Kauhao, Makaha, and Halemanu sites, all on State-owned land (HHP 1990c, 1990f; Timothy Flynn, National Tropical Botanical Garden (NTBG), pers. comm., 1990).

Chamaesyce halemanui is a scandent (climbing) shrub in the spurge family (Euphorbiaceae) with stems 3 to 13 ft (1 to 4 m) long. The egg-shaped to inversely lance-shaped leaves are decussate (successive pairs of leaves at right angles to the previous pair). The leaves are 1.6 to 5 in (4 to 13 cm) long and 0.4 to 1.8 in (1 to 4.5 cm) wide, with persistent stipules (small appendages at the base of the petioles (stem of the leaf)). Groups of flowers (cyathia) are in dense, compact, nearly spherical clusters or occasionally solitary in leaf axils. The stems of cyathia are about 0.08 in (2 millimeters (mm)) long, or if solitary, about 0.2 in (5 mm) long. The fruits are green capsules, about 0.1 in (3 mm) long, on recurved stalks, enclosing gray to brown seeds. *Chamaesyce halemanui* is distinguished from closely related species by its decussate leaves, persistent stipules, more compact flower clusters, shorter stems on cyathia, and smaller capsules (Koutnik 1987, Koutnik and Huft 1990).

Chamaesyce halemanui typically grows on the steep slopes of gulches in mesic koa forests at an elevation of 2,100 to 3,600 ft (660 to 1,100 m) (HHP 1990a, 1990e). Associated native species

include 'ohi'a, *Alphitonia ponderosa* (kauila), *Antidesma platyphyllum* (hame), *Coprosma* (pilo), *Diospyros* (lama), *Dodonaea viscosa* ('a'ali'i), *Elaeocarpus bifidus* (kalia), *Pisonia* (papala kepau), *Santalum freycinetianum* ('iliahi), and *Styphelia tameiameiae* (pukiawe) (HHP 1990a, 1990c, 1990e, 1990f; T. Flynn, pers. comm., 1990). Associated alien species include *Aleurites moluccana* (kukui), *Lantana camara* (lantana), *Psidium cattleianum* (strawberry guava), *Rubus arautus* (blackberry), and *Stenotaphrum secundatum* (St. Augustine grass) (HHP 1990e, 1990f; T. Flynn, pers. comm., 1990).

The greatest immediate threat to the survival of *Chamaesyce halemanui* is competition for space and light from alien plants: St. Augustine grass, lantana, and strawberry guava (T. Flynn, pers. comm., 1990; Joel Lau, HHP, pers. comm., 1990). Habitat degradation by feral pigs (*Sus scrofa*) (digging activity which destroys plants and leads to soil erosion and the invasion of alien plants) threatens the Kauhao and Makaha populations of this species (J. Lau, pers. comm., 1990). The 3 known populations, which extend over a distance of about 2 mi (3 km), contain an estimated 50 individuals (HHP 1990c, 1990f; T. Flynn, pers. comm., 1990; Steven Perlman, Hawaii Plant Conservation Center (HPCC), pers. comm., 1990). With such a small population size and restricted distribution, *C. halemanui* faces an increased potential for extinction resulting from stochastic events. This species' limited gene pool also constitutes a serious potential threat because of the possibility of depressed reproductive vigor.

Dubautia latifolia was first collected in the mountains of Kauai by the U.S. Exploring Expedition in 1840 (Carr 1982). Twenty-one years later, Asa Gray (1861) described that specimen as *Railliardia latifolia* (an orthographic error for *Railliardia latifolia*, as Sherff pointed out in 1935), in reference to its broad leaves. In 1936, David Keck transferred the name to the genus *Dubautia*. Sherff published the name *Railliardia latifolia* var. *helleri* in 1952, which Gerald Carr (1985) considered only a phenological variant not worthy of taxonomic recognition. All collections and confirmed sightings of this species are from six areas: Makaha and Awaawapuhi valleys in Na Pali-Kona Forest Reserve, Nualolo Trail and Valley in Kuia Natural Area Reserve, Halemanu in Kokee State Park, along Mohihi Road in both Kokee State Park and Na Pali-Kona Forest Reserve, along the Mohihi-Waialae Trail on Mohihi and Kohua ridges in both Na Pali-Kona Forest Reserve and Alakai Wilderness Preserve, and Kaholuamanu on privately owned land (Carr 1982; HHP 1990h to 1990m; T. Flynn, pers. comm., 1990). *Dubautia latifolia* is known to occur at all but the Halemanu and Kaholuamanu sites (T. Flynn, J. Lau, and S. Perlman, pers. comms., 1990). The species is now known only from State-owned land.

Dubautia latifolia is a diffusely branched, woody vine in the aster family (Asteraceae) with stems up to 26 ft (8 m) long and occasionally up to 3 in (7 cm) in diameter near the base. The paired, egg- to oval-shaped leaves are 3 to 7 in (8 to 17 cm) long and 1 to 3 in (2.5 to 7 cm) wide. The leaves are conspicuously net-veined, with the smaller veins outlining nearly square areas. The distinct petioles are usually about 0.2 in (5 mm) long. The inflorescences comprise a large aggregation of very small, yellowflowered heads. The fruits are dry seeds, usually about 0.2 in (5 mm) long. A vining habit, distinct petioles, and broad leaves with conspicuous net veins outlining squarish areas separate *Dubautia latifolia* from closely related species (Carr 1982, 1985, 1990).

Dubautia latifolia typically grows on gentle to steep slopes on well drained soil in semi-open, diverse montane mesic forest dominated by koa with 'ohi'a, at an elevation of 3,200 to 3,900 ft (975 to 1,200 m) (Carr 1982, 1990; HHP 1988; HPCC 1990a). Less often, this species is found in either closed forest, conifer plantations, or 'ohi'a-dominated forest, and as low as 2,800 ft (850 m) in elevation (HHP 1988, 1990j, 1990k; HPCC 1990a). The most common associated native species are kauila, *Athyrium sandwicensis*, *Bobea* ('ahakea), *Coprosma waimeae* ('olena), *Dicranopteris linearis* (uluhe), *Hedyotis terminalis* (manono), *Ilex anomala* (aiea), *Melicope anisata* (mokihana), *Psychotria mariniana* (kopiko), and *Scaevola* (naupaka kuahiwi) (Carr 1982; HHP 1990g, 1990h, 1990j to 1990m). Associated alien species include blackberry, strawberry guava, *Acacia mearnsii* (black wattle), *Acacia melanoxylon* (Australian blackwood), *Erigeron karvinshianus* (daisy fleabane), *Hedychium* (ginger), *Lonicera japonica* (honeysuckle), *Myrica faya* (firetree), and *Passiflora mollissima* (banana poka) (Carr 1982; HHP 1990g, 19901; HPCC 1990d; T. Flynn, pers. comm., 1990).

The greatest immediate threat to the survival of *Dubautia latifolia* is competition from alien plants. Banana poka, a vine now invading four of *D. latifolia*'s six diffuse populations, is the most serious threat (Carr 1982, 1985). Blackberry, honeysuckle, black wattle, Australian blackwood, ginger, daisy fleabane, and strawberry guava are other alien species that dominate the habitat of and/or threaten *D. latifolia* (HHP 1990g, 1990h, 1990k, 1990m; HPCC 1990a, 1990d; T. Flynn, pers. comm., 1990). Habitat degradation by feral pigs currently threatens four populations of *D. latifolia* (HHP 1990m; T. Flynn and J. Lau, pers. comms., 1990). Black-tailed deer (*Odocoileus hemionus columbianus*) threaten two populations through trampling that destroys plants and disturbs the ground, leading to soil erosion and favoring the invasion of alien plants; predation by deer is also a probable threat (HHP 1989; HPCC 1990a; S. Perlman, pers. comm., 1990). Vehicle traffic and road maintenance constitute a potential threat to several *D. latifolia* individuals that overhang a State park road. This species suffers from a seasonal dieback that could be a potential threat (Gerald Carr, University of Hawaii, pers. comm., 1990).

Since at least some individuals of *D. latifolia* require cross-pollination, the wide spacing of individual plants (e.g., each 0.3 mi (0.5 km) apart) may pose a threat to the reproductive potential of the species (Carr 1982). The very low seed set noted in plants in the wild indicates a reproductive problem, possibly flowering asynchrony (G. Carr, pers. comm., 1990). Seedling establishment is rather rare in the wild (Carr 1982), presumably due to limited reproduction. The estimated 40 individuals of *D. latifolia* known to be extant are spread over a total distance of about 6.5 by 2.5 mi (10.5 by 4 km) (Carr 1982; HHP 1990h, 1990j; to 1990m; S. Perlman, pers comm., 1990), comprising a limited gene pool that constitutes a potential threat to the species.

Probably the earliest collection of *Poa sandvicensis* was that of Horace Mann and William Brigham from "above Waimea" in 1864 or 1865 (Hillebrand 1888). This species was first described as *Festuca sandvicensis* by H.W. Reichardt in 1878, based on collections from Halemanu. Ten years later, William Hillebrand (1888) described Mann and Brigham's specimen, along with other material, as *Poa longeradiata*. In 1922, Albert Hitchcock combined these and additional collections under the name *Poa sandvicensis*.

All collections and confirmed sightings of this species are from six areas: the rim of Kalalau Valley in Ka Pali Coast State Park; Halemanu and

Kumuwela Ridge/Kauaikinana drainage in Kokee State Park; Awaawapuhi Trail in Na Pali-Kona Forest Reserve; Kohua Ridge/Mohihi drainage in both the Forest Reserve and Alakai Wilderness Preserve; and Kaholuamanu on privately owned land (HHP 1990n, 1990p, 1990q; HPCC 1990b; Hitchcock 1922; T. Flynn, pers. comm., 1990). *Poa sandvicensis* is known to be extant at the Kalalau, Awaawapuhi, Kumuwela/Kauaikinana, and Kohua/Mohihi localities; it is therefore currently known only from State-owned land. Hillebrand's (1888) questionable reference to a Maui locality is most likely an error.

Poa sandvicensis is a perennial grass (family Poaceae) with densely tufted, mostly erect culms (stems) 1 to 3.3 ft (0.3 to 1 m) tall. The short rhizomes (underground stems) form a hardened base for the solid, slightly flattened culms. The leaf sheaths are closed and fused, but may split with age. The toothed ligule (appendage where leaf sheath and blade meet) completely surrounds the culm and has a hard tooth extending upward from the mouth of the sheath. The leaf blades are 4 to 8 in (10 to 20 cm) long, and up to 0.2 in (6 mm) wide. The flowers occur in complex clusters with lower panicle (primary) branches up to 4 in (10 cm) long. The lemmas (inner bracts) have only a sparse basal tuft of cobwebby hairs. The fruits are golden brown to reddish brown, oval grains. *Poa sandvicensis* is distinguished from closely related species by its shorter rhizomes, shorter culms which do not become rush-like with age, closed and fused sheaths, relatively even-edged ligules, and longer panicle branches (O'Conner 1990).

Poa sandvicensis grows on wet, shaded, gentle to usually steep slopes, ridges, and rock ledges in semi-open to closed, mesic to wet, diverse montane forest dominated by 'ohi'a, at an elevation of 3,400 to 4,100 ft (1,035 to 1,250 m) (HHP 1990n to 1990q; HPCC 1990b). Associated native species include koa, kopiko, manono, naupaka kuahiwi, pilo, *Cheirodendron* ('olapa), and *Syzygium sandwicensis* ('ohi'a ha) (HHP 1990n, 1990p, 1990q; HPCC 1990b; T. Flynn, pers. comm., 1990). Associated alien species include blackberry, banana poka, ginger, and daisy fleabane (HHP 1990p; T. Flynn, pers. comm., 1990).

The greatest immediate threat to the survival of *Poa sandvicensis* is competition from alien plants. Daisy fleabane is the primary alien plant threat to the Halalau population of *P. sandvicensis* (T. Flynn, pers. comm., 1990). Blackberry threatens the Awaawapuhi, Kalalau, and Kohua Ridge populations (HHP 1990q; T. Flynn, pers. comm., 1990). Banana poka and ginger also threaten the Awaawapuhi population (HHP 1990p). Erosion caused by pigs currently threatens the Kohua Ridge population, and both pigs and goats (Caprus hircus) (which trample plants, cause erosion, and promote the invasion of alien plants) threaten the Kalalau population (HHP 1990m; HPCC 1990b; T. Flynn and J. Lau, pers. comms., 1990). State forest reserve trail maintenance threatens the trailside Awaawapuhi population (HHP 1990p). While about 40 individuals of *P. sandvicensis* are known from 4 populations spread over a distance of about 5 by 2 mi (8 by 3 km), 80 percent of the plants are concentrated at 1 major site (HHP 1990n, 1990q; T. Flynn, pers. comm., 1990). This species is therefore subject to an increased potential for extinction resulting from stochastic events, because a single event could extirpate 80 percent of the known individuals. The small population size with its limited gene pool also constitutes a serious potential threat.

Poa siphonoglossa was first collected in 1910 by Abbe Urbain Faurie, and was described two years later by E. Hackel (1912). According to Hitchcock (1922), one of the two specimens on which Hackel based his description was actually *poa mannii*. While the localities for Faurie's two specimens are confused, the specimen that Hitchcock designated as the type was most likely collected at an elevation of about 3,000 ft (1,000 m) above Waimea town, possibly near Kaholuamanu (Hitchcock 1922).

All collections and confirmed sightings of *Poa siphonoglossa* are from two sites: Kohua Ridge in Na Pali-Kona Forest Reserve, and near Haholuamanu on privately owned land (HHP 1990r). *Poa siphonoglossa* is only known to be extant on Kohua Ridge, on State-owned land.

An additional *Poa* specimen sharing characteristics of both *P. siphonoglossa* and *P. mannii* was collected in 1988 by David Lorence from Kaulaula Valley in Puu Ka Pele Forest Reserve (David Lorence, NTBG, pers. comm., 1990). Lorence and other local botanical authorities believe that the two species are conspecific, representing different growth stages. Even if the two names are combined, the plant remains extremely rare, since *Poa mannii* has not been collected since 1916 (O'Conner 1990). O'Conner (1990) treats *P. siphonoglossa* and *P. mannii* as distinct species.

Poa siphonoglossa differs from *P. sandvicensis* principally by its longer culms, lack of a prominent tooth on the ligule, and shorter panicle branches. *Poa siphonoglossa* has extensive tufted and flattened culms that cascade from banks in masses up to 13 ft (4 m) long. The naked, rush-like older culms have bladeless sheaths; the sheaths do not split with age. The ligule has no hard tooth. The flat, loosely packed leaf blades are usually less than 4 in (10 cm) long and 0.1 in (3 mm) wide. The primary panicle branches are about 0.1 in (3 cm) long. The lemmas lack cobwebby hairs. The fruits are reddish brown and oval. Short rhizomes, long culms, closed and fused sheaths, and lack of a tooth on the ligule separate *P. siphonoglossa* from *P. mannii* and other closely related species (O'Conner 1990).

Poa siphonoglossa typically grows on shady banks near ridge crests in predominantly native mesic 'ohi'a forest between about 3,300 and 3,900 ft (1,000 to 1,200 m) in elevation (HHP 1990r, : Hitchcock 1922). Associated species include the natives 'a'ali'i, manono, *Melicope* (alani), and *Vaccinium* ('ohelo), and the alien blackberry (HHP 1990r). The population from Kaulaula Valley, whose characteristics are similar to both *P. siphonoglossa* and *P. mannii*, grows on a steep, shady slope in koa forest with occasional 'ohi'a at an elevation of 2,900 ft (890 m) (D. Lorence, pers. comm., 1990). Associated species include pukiawe, *Carex meyenii, Carex wahuensis*, and *Wilkesia gymnoxiphium* (iliau) (T. Flynn, pers. comm., 1990).

The primary threat to the survival of *Poa siphonoglossa* is habitat degradation by pigs and deer. The Kohua Ridge population of this species may be at risk due to erosion caused by pigs (J. Lau, pers. comm., 1990), and the presence of both pigs and deer may threaten the Kaulaula population (T. Flynn, pers. comm., 1990). Predation by deer is also a potential threat there. The alien blackberry invading Kohua Ridge constitutes a probable threat to that population (HHP 1990r). *Poa siphonoglossa* (including the Kaulaula population) numbers fewer than 30 known individuals located at 2 populations about 6 mi (10 km) apart (HHP 1990r; T. Flynn, pers. comm., 1990). A limited gene pool and potential for one disturbance event to destroy the majority of known individuals are serious threats to this species.

Stenogyne campanulata was discovered in 1986 by Steven Montgomery on sheer, virtually inaccessible cliffs below the upper rim of Kalalau Valley on Kauai. The species is known only from that single population. In 1989, Stephen Weller and Ann Sakai described the plant as a new

species, naming it for the flowers' bell-shaped calyces. Known only from State-owned land, *S. campanulata* is restricted to Na Pali Coast State Park.

Stenogyne campanulata is a member of the mint family (Lamiaceae), described as a vine with four-angled, hairy stems. The hairy leaves are broadly oval, about 2 in (5 cm) long and 1 in (3 cm) wide. The flowers occur in clusters of about 6 per leaf axil. The very broadly bell-shaped, hairy calyces are about 0.5 in (13 mm) long, with teeth that are 0.1 in (3 mm) long and 0.2 in (5 mm) wide at the base. The petals are fused into a straight, hairy, white tube about 0.5 in (13 mm) long, with short purple lobes. The fruits of this species have not been seen, but the fruit of all other members of this genus are fleshy nutlets. *Stenogyne campanulata* is distinguished from closely related species by its large and very broadly bell-shaped calyces that nearly enclose the relatively small, straight corollas, and by small calyx teeth that are half as long as wide (Weller and Sakai 1990).

Stenogyne campanulata grows on the rock face of a nearly vertical, north-facing cliff at an elevation of 3,580 ft. (1,085 m) (Weller and Sakai 1990; T. Flynn and S. Perlman, pers. comms., 1990). The associated shrubby vegetation includes the native species *Artemisia australis* ('ahinahina), *Lepidium serra* ('anaunau), *Lysimachia glutinosa, Perrottetia sandwicensis* (olomea), and *Remya montgomeryi*, and alien blackberry and daisy fleabane (T. Flynn, pers. comm., 1990).

Habitat degradation by feral goats is the primary threat to the survival of *Stenogyne campanulata* (T. Flynn, pers. comm., 1990). The restriction of this species to virtually inaccessible cliffs suggests that predation by goats may have eliminated it from more accessible locations. Such predation remains a potential threat because goats may limit seedling establishment in more accessible areas and if they reached existing plants, losses could occur (T. Flynn, pers. comm., 1990). Feral pigs have disturbed vegetation in the vicinity of the only known population (T. Flynn, pers. comm., 1990). Erosion caused by goats or pigs exacerbates the potential threat of landslides to this population (T. Flynn, pers. comm., 1990). Daisy fleabane and *Rubus argutus* (blackberry) are the primary alien plants threatening *Stenogyne campanulata* (T. Flynn and S. Perlman, pers. comms., 1990; HPCC 1990c). *Stenogyne campanulata* is estimated to number 50 plants at the very most, all of which are concentrated at a single site (T. Flynn, pers. comm., 1990). The small size of the single known population and its restricted distribution (probably well under 500 sq ft (45 sq m) in area) are serious potential threats to the species. The limited gene pool may depress reproductive vigor, or a single environmental disturbance such as a landslide could destroy all known extant individuals.

Xylosma crenatum was first collected in 1917 by Charles Forbes on the west side of the Waimea drainage basin. However, the collection was misidentified as *Hibiscus waimeae* (HHP 1990a). Over 50 years later (in 1968), Robert Hobdy made the second collection of this plant, along the banks of Mohihi Stream at the edge of the Alakai Swamp. Finally in 1972, Harold St. John recognized the plant as a distinct species, and named it *Antidesma crenatum*, after the rounded teeth along the leaf edges (St. John 1972). In 1976, St. John transferred the name to the genus *Xylosma*.

All collections subsequent to 1968 and confirmed sightings of *Xylosma crenatum* are from two sites: along upper Nualolo Trail in Kuia Natural Area Reserve and along Mohihi Road between Waiakoali and Mohihi drainages in Na Pali-Kona Forest Reserve (HHP 1990a, 1990b; T. Flynn, pers. comm., 1990; Robert Hobdy, State Division of Forestry and Wildlife (DOFAW), pers. comm., 1990). *Xylosma crenatum* is apparently extant only at the latter site (R. Hobdy and J. Lau, pers. comms., 1990). This species is found only on State-owned land.

Xylosma crenatum is a dioecious (unisexual) tree in the flacourtia family (Flacourtiaceae), growing up to 46 ft (14 m) tall, and with dark gray bark. The somewhat leathery leaves are oval to elliptic-oval, about 4 to 8 in (10 to 20 cm) long and 2.5 to 4 in (6.5 to 10 cm) wide, with coarsely toothed edges and moderately hairy undersides. The female flowers (male flowers have not been described) occur in clusters of 3 to 11 per leaf axil. The four oval sepals are about 0.1 in (2.5 mm) long; petals are absent. The young berries are oval to elliptic-oval and about 0.3 in (7 mm) long (mature fruits have not been seen). More coarsely toothed leaf edges and hairy undersides of the leaves distinguish *Xylosma crenatum* from the other Hawaiian member of this genus (St. John 1972, Wagner *et al.* 1990).

Xylosma crenatum is known from diverse koa/'ohi'a montane mesic forest at an elevation of about 3,200 to 3,500 ft (975 to 1,065 m), sometimes along stream banks or within a planted conifer grove (HHP 1990b; St. John 1972; R. Hobdy, pers. comm., 1990). Associated species include the native manono and *Athyrium sandwicensis* and alien strawberry guava (HHP 1990c).

The three historical populations of *Xylosma crenatum* have apparently been reduced to one female individual and no regeneration is evident at the site (J. Lau, pers. comm., 1990). However, since half-mature fruits have been observed at least twice on this individual (J. Lau *in litt.*, 1990), successful reproduction may be possible. These immature fruits are either the product of asexual reproduction (apomixis or parthenocarpy) or of sexual reproduction with an as yet undiscovered male plant within pollinating distance. Because no surveys for this species have been conducted in its rather inaccessible habitat, it is hoped that additional research will reveal the presence of more individuals, including male plants. In any case, the total size of the population is probably very limited. Furthermore, a single human-caused or natural environmental disturbance (such as continued bulldozing during maintenance activities along the adjacent State forest reserve road) could easily destroy the only known individual of the species (J. Lau, pers. comm., 1990). *Xylosma crenatum* is also threatened by competition from alien plants, particularly strawberry guava, as well as the conifers dominating the only known site (HHP 1990c). In addition, feral pigs may threaten this species (T. Flynn, pers. comm., 1990).

Previous Federal Action

Federal action on these plant species began as a result of section 12 of the Act, which directed the Secretary of the Smithsonian Institution to prepare a report on plants considered to be endangered, threatened, or extinct in the United States. This report, designated as House Document No. 94-51, was presented to Congress on January 9, 1975. In that document, *Chamaesyce halemanui* (as *Euphorbia halemanui*), *Dubautia latifolia* (as *D. latifolia* var. *latifolia*), *Poa sandvicensis*, and *Xylosma crenatum* (as *Antidesma crenatum*) were considered to be endangered. On July 1, 1975, the Service published a notice in the Federal Register (40 FR 27823) of its acceptance of the Smithsonian report as a petition within the context of section 4(c)(2) (now section 4(b)(3)) of the Act, and giving notice of its intention to review the status of the plant taxa named therein. As a result of that review, on June 16, 1976, the Service published a proposed rule in the Federal Register (41

FR 24523) to determine endangered status pursuant to section 4 of the Act for approximately 1,700 vascular plant species, including *Chamaesyce halemanui, Dubautia latifolia, Poa sandvicensis,* and *Xylosma crenatum.* The list of 1,700 plant taxa was assembled on the basis of comments and data received by the Smithsonian Institution and the Service in response to House Document No. 94–51 and the July 1, 1975, **Federal Register** publication.

General comments received in response to the 1976 proposal are summarized in an April 26, 1978, **Federal Register** publication (43 FR 17909). In 1978, amendments to the Act required that all proposals over 2 years old be withdrawn. A 1-year grace period was given to proposals already over 2 years old. On December 10, 1979, the Service published a notice in the **Federal Register** (44 FR 70796) withdrawing the portion of the June 16, 1976, proposal that had not been made final, along with four other proposals that had expired. The Service published updated notices of review for plants on December 15, 1980 (45 FR 82479), and September 27, 1985 (50 FR 39525), including *Chamaesyce halemanui* (as *Euphorbia halemanui*), *Dubautia latifolia, Poa sandvicensis,* and *Poa siphonoglossa* as Category 1 candidates. Category 1 species are those for which the Service has on file substantial information on biological vulnerability and threats to support preparation of listing proposals. *Xylosma crenatum* was included as a Category 2 candidate species on both notices, meaning that the Service had some evidence of vulnerability, but not enough data to support a listing proposal at the time. In the latest notice of review, published on February 21, 1990 (55 FR 6183), all six of the species included in this final rule were considered Category 1 candidates. *Stenogyne campanulata* was not included in prior notices, since it was not discovered until 1986.

Section 4(b)(3)(B) of the Act requires the Secretary to make findings on certain pending petitions within 12 months of their receipt. Section 2(b)(1) of the 1982 amendments further requires all petitions pending on October 13, 1982, be treated as having been newly submitted on that date. On October 13, 1983, the Service found that the petitioned listing of these species was warranted, but precluded by other pending listing actions, in accordance with section 4(b)(3)(B)(iii) of the Act; notification of this finding was published on January 20, 1984 (49 FR 2485). Such a finding requires the petition to be recycled, pursuant to section 4(b)(3)(C)(i) of the Act. The finding was reviewed in October of 1984, 1985, 1986, 1987, 1988, and 1989.

On September 26, 1990, the Service published in the **Federal Register** (55 FR 39301) a proposal to list *Chamaesyce halemanui, Dubautia latifolia, Poa sandvicensis, Poa siphonoglossa, Stenogyne campanulata,* and *Xylosma crenatum* as endangered. This proposal was based primarily on information supplied by the Hawaii Heritage Program, reports from the Hawaii Division of Forestry and Wildlife, and observations of botanists and naturalists. The Service now determines *Chamaesyce halemanui, Dubautia latifolia, Poa sandvicensis, Poa siphonoglossa, Stenogyne campanulata,* and *Xylosma crenatum* to be endangered species with the publication of this rule.

Summary of Comments and Recommendations

In the September 26, 1990, proposed rule and associated notifications, all interested parties were requested to submit factual reports or information relevant to a final decision on the listing proposal. The public comment period ended on November 27, 1990. Appropriate State agencies, county and city governments, Federal agencies, scientific organizations, and other interested parties were contacted and requested to comment. The original advertising order for the legal notice that the Service is required to publish in a local newspaper was lost, which required the reopening of the comment period. A notice was published in The Garden Island on January 10, 1991, and in the **Federal Register** on December 26, 1990 (55 FR 53014) reopening the comment period until February 25, 1991 and inviting general public comment. Two comments were received, from conservation organizations that offered additional information and, in one case, supported listing the six species as endangered. New information received has been incorporated into this rule.

Summary of Factors Affecting the Species

After a thorough review and consideration of all information available, the Service has determined that *Chamaesyce halemanui, Dubautia latifolia, Poa sandvicensis, Poa siphonoglossa, Stenogyne campanulata,* and *Xylosma crenatum* should be classified as endangered species. Procedures found at section 4 of the Endangered Species Act (16 U.S.C. 1533) and regulations (50 CFR part 424) promulgated to implement the listing provisions of the Act were followed. A species may be determined to be an endangered or threatened species due to one or more of the five factors described in section 4(a)(1). These factors and their application to *Chamaesyce halemanui* (Sherff) Croizat and Degener (NCN), *Dubautia latifolia* (A. Gray) Keck (NCN), *Poa sandvicensis* (Reichardt) Hitchc. (Hawaiian bluegrass), *Poa siphonoglossa* Hack. (NCN), *Stenogyne campanulata* Weller and Sakai (NCN), and *Xylosma crenatum* (St. John) St. John (NCN) are as follows:

A. The Present or Threatened Destruction, Modification, or Curtailment of its Habitat or Range

The flora of the Kokee region is considered very vulnerable because of past and present land management practices, including grazing, deliberate alien plant and animal introductions, water diversion, and recreational development (Wagner *et al.,* 1985). Feral animals have made the greatest overall impact, altering and degrading the vegetation and habitats of the Kokee region.

Cattle (*Bos taurus*) were introduced to Kauai by the 1820s and were allowed to run wild (Joesting 1984). Cattle not only feed on native vegetation, but trample roots and seedlings, cause erosion, and promote the invasion of alien plants by creating new sites for colonization, and by spreading seeds in their feces and on their bodies (Scott *et al.,* 1986). In addition, cattle trails provide new routes for feral pigs to expand their range (*e.g.,* into the Alakai Swamp) (Paul Higashino, The Nature Conservancy of Hawaii, pers. comm., 1981). Kokee was leased for cattle grazing in the 1850s (Ryan and Chang 1985). Large cattle ranching operations were underway on both flanks of Waimea Canyon by the 1870s, with many animals wandering into the upper forests. Feral cattle were common at Halemanu in Kokee at this time (Joesting 1984). Concerned over the destruction of upland forests by cattle and goats, Augustus Knudsen, the district forester and cattle rancher on the west side of Waimea Canyon, built a 2 mi (3 km) fence in 1898 near the southwest corner of what became Kokee State Park in 1952 (Daehler 1973b). Knudsen had begun eliminating cattle from the northern (Kokee) side of this boundary in 1882. Three of the six Kokee plant species in this rule historically occurred within 0.5 mi (0.8 km) of this boundary on the Kokee side. Most of the Kokee region, as far southwest as Knudsen's boundary fence, was given forest reserve status (Na Pali-Kona

Forest Reserve) in 1907 to protect the watershed from further erosion by feral animals and to ensure the future water supply for lowland use (Daehler 1973a). At that time, Knudsen described the area south of the boundary fence as grazing land outside any true forest (Daehler 1973b). One of the plants in this rule (*P. siphonoglossa*) occurs in this area, which in 1938 was designated Puu Ka Pele Forest Reserve and described as unsuitable for grazing because of excessive soil erosion (Daehler 1973b). On the east side of Waimea Canyon, efforts were underway by 1904 to eliminate cattle from the uplands, including the Alakai Swamp (Daehler 1973a). In 1916 considerable damage by cattle to the forests around the Alakai Swamp was reported (Daehler 1973a). Stray unbranded ranch stock still roamed the forests of Kokee and Puu Ka Pele in the 1960s (Tomich 1986). The State-owned portion of the Alakai Swamp was designated a Wilderness Preserve in 1964. Today, very few if any cattle remain within the range of the six plant species.

Feral goats have inhabited the drier, more rugged areas of Kauai since the 1820s (Cuddihy and Stone 1990). Like cattle, feral goats consume native vegetation, trample roots and seedlings, cause erosion, and promote the invasion of alien plants (Scott *et al.* 1986). They have denuded many ridges of Waimea Canyon, including areas within the historical distribution of *Dubautia latifolia, Poa sandvicensis,* and *P. siphonoglossa* (Daehler 1973a). During dry periods, goats venture into wet areas, including the Kokee region (Scott *et al.* 1986). They have degraded the forests at the drier edge of the Alakai Swamp, which lie within the present range of the six species in this rule (Scott *et al.* 1986). Although the State attempted to remove goats when the forest reserve was established in 1907, these animals are now managed by the State as a game species, with a limited hunting season (Daehler 1973a, Tomich 1986). Goats are considered a serious threat to the lower and drier outlying sections of the Kokee region (HHP and DOFAW 1989), coinciding roughly with the lower elevation limit of the six species in this rule. The primary threat to *Stenogyne campanulata* is habitat degradation by feral goats (T. Flynn, pers. comm., 1990). While browsing on vegetation, goats disturb the ground, accelerating erosion and creating sites for invasion by more aggressive alien plant species. The restriction of *Stenogyne campanulata* to virtually inaccessible cliffs suggests that predation by goats may have eliminated the species from more accessible locations, as is the case for many rare plants of the Na Pali region. Goats also threaten the Kalalau population of *Poa sandvicensis,* 0.3 mi (0.5 km) from the *Stenogyne* site (T. Flynn, pers. comm., 1990).

Feral pigs have inhabited forests of Kauai for at least 100 years (Cuddihy and Stone 1990). Pigs consume native plants, destroy vegetation by rooting and trampling, cause severe erosion, and spread alien plant seeds in their feces (Scott *et al.* 1986). Pig activity promotes the establishment of alien plants by creating open spaces and increasing soil fertility with their feces; without the disturbance and increase in nutrients, many native species would have an advantage because endemic species often are better adapted to less disturbed sites with poorer soils (Stone 1985).

Because pigs typically expand their range in forested areas by following trails made by other animals or human beings, their ingress into areas of native vegetation has been aided by various human activities (Culliney 1988). Cattle trails helped open the Alakai Swamp to pig traffic (Paul Higashino, The Nature Conservancy, pers. comm., 1981). The sandalwood trade that flourished on Kauai between about 1810 and 1840 created innumerable minor trails, as Hawaiians dragged the logs on their backs down to Waimea on the southern coast from throughout the upland forests (Anonymous 1978, Joesting 1984). To provide irrigation for the expanding sugar cane industry in the lowlands, the extensive Kokee/Kekaha ditch and water diversion system was built in the 1920s. Access roads and trails to and along the ditch and tunnels enabled feral pigs to gain new access to Kokee's native forests (Culliney 1988). The food source provided by plum trees (*Prunus cerasifera* X *P. salicina*) planted in Kokee State Park during the 1930s has attracted greater concentrations of pigs to the general vicinity of several of the species in this rule.

Currently, pigs are recognized as the primary feral animal threat to the upland forests of the Kokee region (HHP and DOFAW 1989), common in both wet and mesic areas. At least five of these species are threatened by habitat degradation by feral pigs. Fresh pig sign was noted in November, 1989, and May, 1990, throughout the area of Kohua Ridge where populations of *Poa sandvicensis, P. siphonoglossa,* and *Dubautia latifolia* are located (HHP 1990m; J. Lau, pers. comm., 1990). At this steep site, erosion caused by pig activity is a present threat to the two *Poa* species (J. Lau, pers. comm., 1990). The extensive erosion scars on lower Kohua Ridge are expanding and gradually moving upslope toward these two species (J. Lau, pers. comm., 1990). Similarly, by increasing erosion, pig activity would exacerbate the potential threat of landslides to the only known population of *Stenogyne campanulata* on the nearly vertical rim of Kalalau (T. Flynn, pers. comm., 1990). Just 0.3 mi (0.5 km) from the *Stenogyne* population, there was considerable pig damage to vegetation adjacent to a population of *Poa sandvicensis* in May, 1990 (T. Flynn, pers. comm., 1990). For *Dubautia latifolia,* pigs constitute a definite threat at the Awaawapuhi population and are known to have caused damage near the Nualolo population (HHP 1989; J. Lau, pers. comm., 1990). Pig sign has been reported from within 200 yards (180 m) of one *D. latifolia* individual in the Mohihi Road population, and from near the Kauhao and Makaha populations of *Chamaesyce halemanui* (T. Flynn and J. Lau, pers. comms., 1990). Pigs are a potential threat to the Kaulaula population of *Poa siphonoglossa* and may also threaten the only known individual of *Xylosma crenatum* (T. Flynn, pers. comm., 1990).

Black-tailed deer were first introduced to the forests of western Kauai in 1961 (Culliney 1988). The estimated 350 animals now occupy dry to mesic, alien-dominated forests up to an elevation of 4,000 ft (1,220 m), including the lower distributional range of these 6 Kokee plant species (Cuddihy and Stone 1990). Like other feral ungulates, deer feed on and trample native vegetation. Deer trails and loss of vegetation from deer foraging activities can cause erosion. Deer are a serious threat to the lower and drier outlying sections of the Kokee region (HHP and DOFAW 1989). Deer also are known to range into the wettest portion of the Kokee area during dry periods, constituting a potential threat to the wet forest habitat (Scott *et al.* 1986). Light to moderate damage by deer was reported from the vicinity of the Nualolo population of *Dubautia latifolia* in 1989 (also a former site of *Xylosma crenatum*) (HHP 1989). Deer occur in the area of the Kaulaula population of *Poa siphonoglossa* and the Makaha population of *Dubautia latifolia,* constituting a potential threat (HPCC 1990a; T. Flynn and S. Perlman, pers. comms., 1990).

In November 1982, Typhoon Iwa caused locally extensive damage to the forest canopy in many parts of Kauai, including numerous areas in the Kokee region. The vicinity of the *Dubautia latifolia* site (and former *Xylosma*

crenatum site) along Nualolo Trail was one such area (R. Hobdy, pers. comm., 1990). Since the Nualolo population of *Xylosma crenatum* was not found during a recent survey of the Kuia Natural Area Reserve, it seems likely that the typhoon destroyed the two 40 ft (12 m) individuals that had constituted that population (HHP 1989). Typhoon Iwa's damage to the forest canopy also greatly exacerbated the invasion of fast-growing, light-loving alien plants, which pose a major threat to the native plants of the Kokee region (Wagner *et al.* 1985). Along Nualolo Trail, banana poka, strawberry guava, and blackberry have shown the greatest growth response, threatening *Dubautia latifolia* and other native species (HHP 1989, 1990j).

Of the six species in this rule, *Dubautia latifolia* is most seriously threatened by competition from alien plants. Primary among these is banana poka, an aggressive vine introduced to Kokee about 50 years ago, now constituting a major infestation (Carr 1985, Smith 1985). Banana poka kills trees by smothering their canopies with its heavy vines. Once the trees fall, the increased sunlight in the understory favors other fast-growing alien species over native plants (Cuddihy and Stone 1990). With its climbing habit, *D. latifolia* occupies a niche similar to banana poka, often growing in close proximity to the aggressive vine (Carr 1982). Banana poka is therefore considered a serious competitor and threat to *D. latifolia* (Carr 1982). Along with banana poka, alien species such as honeysuckle, black wattle, Australian blackwood, ginger, and strawberry guava dominate the habitat of and threaten the Mohihi Road population of *D. latifolia* (HHP 1990g; T. Flynn, pers. comm., 1990). Alien species are also increasing at the site of the Awaawapuhi population of *D. latifolia* (HHP 1990h). Banana poka and blackberry are invading the Mohihi-Waialae Trail and Makaha populations of this species as well, with blackberry overgrowing the latter area (HHP 1990k, 1990m; HPCC 1990a). Over the past 40 years, blackberry has invaded much of the native wet and mesic forests of Kokee, where it forms dense thickets that compete with native understory species (Cuddihy and Stone 1990, Daehler 1973a). Blackberry threatens the Kalalau population of *Poa sandvicensis* (T. Flynn, pers. comm., 1990), and is invading the westernmost section of the Kohua Ridge population of *P. sandvicensis* and an adjacent population of *P. siphonoglossa* (HHP 1990q, 1990r). Banana poka and ginger, as well as blackberry, threaten the Awaawapuhi population of *P. sandvicensis* (HHP 1990p). The Halemanu population of *Chamaesyce halemanui* is threatened by St. Augustine grass, whose thick growth prevents regeneration of this native tree (T. Flynn, pers. comm., 1990). The other two populations of *C. halemanui* are threatened by lantana and strawberry guava (J. Lau, pers. comm., 1990). Alien plants, particularly strawberry guava, are increasing at the only known site of *Xylosma crenatum* (HHP 1990t). Daisy fleabane is the primary alien plant threat to *Stenogyne campanulata* and the Kalalau population of *Poa sandvicensis* (T. Flynn, pers. comm., 1990).

Several potentially threatening alien plant species were originally introduced deliberately for reforestation or timber utilization. These include conifers (such as the grove surrounding the only known *Xylosma crenatum* individual); firetree, planted on Waimea Canyon's eastern drainages; and karaka nut (*Corynocarpus laevigata*), one of the alien species aerially broadcast over the Kokee region in the 1920s (Daehler 1973a, Wagner *et al.* 1985). While these species do not directly threaten the six species in this rule, they may possibly have crowded out former populations, and eventually could invade extant populations. Marijuana (*Cannabis sativa*) is cultivated in the Kokee region, and that activity is considered a management threat to Kuia Natural Area Reserve, where *Chamaesyce halemanui* and *Dubautia latifolia* occur (HHP and DOFAW 1989). Native vegetation is destroyed when areas are cleared for marijuana cultivation. More significantly, other alien species are inadvertently introduced into the forest from soil and other material brought to the site. After the site is abandoned, it forms a locus for the spread of alien species (Medeiros *et al.* 1988).

Construction of water collection and diversion systems that began in the 1920s for the lowland sugar cane industry damaged the vegetation of Kokee (Wagner *et al.* 1985). Since the Kokee ditch and tunnel system and its access roads run through habitat of four of the six species in this rule (particularly *Xylosma crenatum*), it may possibly have destroyed former populations of those species. The ditch system created new routes for the invasion of alien plants and animals into intact native forest (Culliney 1988). Recreational development, concentrated in the 4,640 acre (1,880 hectare) Kokee State Park, has had an equally significant impact on the native vegetation (Wagner *et al.* 1985). Vacation cabins have existed in Kokee for well over a century. The construction and use of an extensive system of hiking, hunting, fishing, and horse trails (45 mi (72 km) in total) has resulted in the direct destruction of some habitat, and has accelerated the rate of erosion and the spread of alien plants and animals enormously (Wagner *et al.* 1985). Three of the species in this rule are currently threatened by road or trail maintenance activities. State forest reserve road maintenance threatens the sole known individual of *X. crenatum*. Freshly bulldozed dirt was noted immediately adjacent to this plant in November, 1989 (J. Lau, pers. comm., 1990). Forest reserve trail maintenance threatens the Awaawapuhi population of *Poa sandvicensis*. The single clump comprising that population had been cut back to the base by trail clearing, but was resprouting as of September, 1989 (HHP 1990p). Several individuals of *Dubautia latifolia* overhang a State park road, and have been injured by passing vehicles. Road maintenance constitutes a potential threat to these plants.

While fire has been suggested as a threat to *Dubautia latifolia* (Center for Plant Conservation 1990, St. John 1981), experienced field botanists with the most direct knowledge of this species believe that the potential for fire within the mesic habitat of this species is quite low (T. Flynn, J. Lau, and S. Perlman, pers. comms., 1990). The same applies to the other five species in this rule.

B. Overutilization for Commercial, Recreational, Scientific, or Educational Purposes

Illegal collecting for scientific or horticultural purposes or excessive visits by individuals interested in seeing rare plants could result from increased publicity and could seriously affect several of these species. For five of the species, disturbance to sites by trampling during recreational use (hiking, for example) could promote erosion and greater ingress by competing alien species. The site of the only known individual of *Xylosma crenatum* is relatively accessible. Overutilization is not a factor for *Stenogyne campanulata*, due to the virtually inaccessible location of the only known population. However, trampling of more accessible nearby areas would promote erosion and increased alien plant invasion. *Chamaesyce halemanui, Dubautia latifolia, Poa sandvicensis*, and *P. siphonoglossa* are also subject to potential erosion and weed ingress.

C. Disease or Predation

Although there is no evidence of predation on these species, none of them are known to be unpalatable to goats or deer. Predation is therefore a probable threat at sites where those animals have been reported. Predation by goats is considered a probable threat to *Stenogyne campanulata* and *Poa sandvicensis* (T. Flynn, pers. comm., 1990). The restriction of *S. campanulata* to inaccessible cliffs suggests that predation by goats may have eliminated the species from more accessible locations. Predation by deer potentially threatens *Dubautia latifolia* and *Poa siphonoglossa*. No threat of predation has been reported for *Chamaesyce halemanui* or *Xylosma crenatum*. No evidence of disease is known for any of the species in this rule except perhaps *Dubautia latifolia*, where a seasonal blackening and dieback of shoot tips could potentially be caused by a disease; however, it may instead be a natural phenological phenomenon (G. Carr, pers. comm., 1990).

D. The Inadequacy of Existing Regulatory Mechanisms

All of the known populations of the six plant species in this rule are located on State-owned land, either in forest reserves (five species), parks (four species), a natural area reserve (one species), or a wilderness preserve (two species). State regulations prohibit the removal, destruction, or damage of plants found on these lands. However, the regulations are difficult to enforce because of limited personnel. Hawaii's Endangered Species Act (HRS, section 195D–4(a)) states, "Any species of aquatic life, wildlife, or land plant that has been determined to be an endangered species pursuant to the Endangered Species Act [of 1973] shall be deemed to be an endangered species under the provisions of this chapter****". Further, the State may enter into agreements with Federal agencies to administer and manage any area required for the conservation, management, enhancement, or protection of endangered species (HRS, section 195D–5(c)). Funds for these activities could be made available under section 6 of the Federal Act (State Cooperative Agreements). Listing of these six plant species will therefore reinforce and supplement the protection available to the species under State law. The Federal Act will also offer additional protection to the six species, because it is a violation of the Act for any person to remove, cut, dig up, damage, or destroy an endangered plant in an area not under Federal jurisdiction in knowing violation of any State law or regulation or in the course of any violation of a State criminal trespass law.

E. Other Natural or Manmade Factors Affecting its Continued Existence.

The small number of populations and of individual plants of these species increases the potential for extinction from stochastic events. The limited gene pool may depress reproductive vigor, or a single human-caused or natural environmental disturbance could destroy a significant percentage of the individuals of these species. *Xylosma crenatum* epitomizes the problem of small numbers of extant individuals. For this dioecious species, only one female tree is known and no regeneration is evident at the site (J. Lau, pers. comm., 1990). However, since half-mature fruits have been observed at least twice on this individual (J. Lau *in litt.*, 1990), successful reproduction may be possible. These immature fruits are either the product of asexual reproduction or of sexual reproduction with an as yet undiscovered male plant within pollinating distance. *Stenogyne campanulata* numbers approximately 50 plants at the very most, concentrated at a single site (T. Flynn and S. Perlman, pers. comms., 1990). *Poa siphonoglossa* numbers fewer than 30 known individuals at 2 populations (including the Kaulaula population that also exhibits characteristics of *P. mannii*) (HHP 1990r; T. Flynn, pers. comm., 1990). Although about 40 individuals of *Poa sandvicensis* are known from 4 populations, 80 percent of the plants are concentrated at 1 major site (HHP 1990n, 1990q; T. Flynn, pers. comm., 1990). The approximately 50 known individuals of *Chamaesyce halemanui* are distributed fairly evenly between 3 populations, 2 of them reported to include seedlings as well as mature trees (HHP 1990c, 1990f; T. Flynn, pers. comm., 1990). Most *Dubautia latifolia* populations consist of fewer than 6 plants, often widely scattered (e.g., each 0.3 mi (0.5 km) apart). Individual localities are typically 270 to 1,600 sq ft (25 to 150 sq m) in area (Carr 1982). Only about 40 individuals of *D. latifolia* are known to be extant, also comprising a limited gene pool (Carr 1982; HHP 1990g to 1990m; S. Perlman, pers. comm., 1990).

The Service has carefully assessed the best scientific and commercial information available regarding the past, present, and future threats faced by these species in determining to issue this final rule. Based on this evaluation, the preferred action is to list *Chamaesyce halemanui, Dubautia latifolia, Poa sandvicensis Poa siphonoglossa, Stenogyne campanulata,* and *Xylosma crenatum* as endangered. Total numbers of known individuals of these 6 species range from a low of 1 (*Xylosma crenatum*) to an estimated high of 50 (*Stenogyne campanulata* and *Chamaesyce halemanui*). These species are threatened by one or more of the following: competition from alien plants; habitat degradation by feral pigs, goats, and deer; and trail and road maintenance. Small population size makes these species particularly vulnerable to extinction and/or reduced reproductive vigor from stochastic events. Because these six species are in danger of extinction throughout all or a significant portion of their ranges, they fit the definition of endangered as defined in the Act. Critical habitat is not being designated for these species for reasons discussed in the "Critical Habitat" section of this rule.

Critical Habitat

Section 4(a)(3) of the Act, as amended, requires that to the maximum extent prudent and determinable, the Secretary designate critical habitat at the time a species is determined to be endangered or threatened. The Service finds that designation of critical habitat is not presently prudent for the six species in this rule. The publication of descriptions and maps required when critical habitat is designated would increase the degree of threat to these species from possible take or vandalism and therefore could contribute to their decline and increase enforcement problems. The listing of these species as endangered publicizes the rarity of the plants and thus can make them attractive to researchers, curiosity seekers, or collectors of rare plants. As a result of its nearly inaccessible location, *Stenogyne campanulata* does not appear to be threatened by potential vandalism. However, actions of nearby curiosity seekers could result in increased erosion or cause landslides. Because the known distributions of all six species are on State-owned land and there are no known or anticipated Federal actions for the areas in which the plants are located, designation of critical habitat would have no known benefit to these species. All involved parties and landowners have been notified of the general location and importance of protecting the habitat of these species. Protection of the species' habitat will be addressed through the recovery process. Therefore, the Service finds that designation of critical habitat for these species is not prudent at this time because such designation would increase the degree of threat from

vandalism, collecting, or other human activities and because it is unlikely to aid in the conservation of these species.

Available Conservation Measures

Conservation measures provided to species listed as endangered or threatened under the Endangered Species Act include recognition, recovery actions, requirements for Federal protection, and prohibitions against certain activities. Recognition through listing encourages and results in conservation actions by Federal, State, and private agencies, groups, and individuals. The Endangered Species Act provides for possible land acquisition and cooperation with the State and requires that recovery actions be carried out for all listed species. The protection required of Federal agencies and the prohibitions against certain activities involving listed plants are discussed, in part, below.

Section 7(a) of the Act, as amended, requires Federal agencies to evaluate their actions with respect to any species that is proposed or listed as endangered or threatened and with respect to its critical habitat, if any is being designated. Regulations implementing this interagency cooperation provision of the Act are codified at 50 CFR part 402. Section 7(a) (2) requires Federal agencies to insure that activities they authorize, fund, or carry out are not likely to jeopardize the continued existence of such a species or to destroy or adversely modify its critical habitat. If a Federal action may affect a listed species or its critical habitat, the responsible Federal agency must enter into formal consultation with the Service. As none of these species are on Federal land and no Federal activities are currently anticipated in the area, no section 7 consultations or impact on activities of Federal agencies are anticipated as the result of this rule.

The Act and its implementing regulations found at 50 CFR 17.61, 17.62, and 17.63 set forth a series of general prohibitions and exceptions that apply to all endangered plants. With respect to the six plants from the Kokee region, all trade prohibitions of section 9(a) (2) of the Act, implemented by 50 CFR 17.61, apply. These prohibitions, in part, make it illegal with respect to any endangered plant for any person subject to the jurisdiction of the United States to import or export; transport in interstate or foreign commerce in the course of a commercial activity; sell or offer for sale these species in interstate or foreign commerce; remove and reduce to possession any such species from areas under Federal jurisdiction; maliciously damage or destroy any such species on any area under Federal jurisdiction; or remove, cut, dig up, damage, or destroy listed plants on any other area in knowing violation of any State law or regulation or in the course of any violation of a State criminal trespass law. Certain exceptions apply to agents of the Service and State conservation agencies. The Act and 50 CFR 17.62 and 17.63 also provide for the issuance of permits to carry out otherwise prohibited activities involving endangered plant species under certain circumstances. It is anticipated that few trade permits would ever be sought or issued because the species are not common in cultivation or in the wild. Requests for copies of the regulations on plants and inquiries regarding them may be addressed to the Office of Management Authority, U.S. Fish and Wildlife Service, 4401 N. Fairfax Drive, room 432–ARLSQ, Arlington, Virginia 22203–3507 (703/358–2104 or FTS 921–2104; FAX 703/358–2281).

National Environmental Policy Act

The Fish and Wildlife Service has determined that an Environmental Assessment or Environmental Impact Statement, as defined under the authority of the National Environmental Policy Act of 1969, need not be prepared in connection with regulations adopted pursuant to section 4(a) of the Endangered Species Act of 1973, as amended. A notice outlining the Service's reasons for this determination was published in the Federal Register on October 25, 1983 (48 FR 49244).

References Cited

A complete list of all references cited herein is available upon request from the Pacific Islands Office (see **ADDRESSES** section).

Author

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List of Subjects in 50 CFR Part 17

Endangered and threatened species, Exports, Imports, Reporting and recordkeeping requirements, and Transportation.

Regulations Promulgation

Accordingly, part 17, subchapter B of chapter I, title 50 of the Code of Federal Regulations, is amended as set forth below:

PART 17—[AMENDED]

1. The authority citation for part 17 continues to read as follows:

Authority: 16 U.S.C. 1361–1407; 16 U.S.C. 1531–1544; 16 U.S.C. 4201–4245; Pub. L. 99–625, 100 Stat. 3500; unless otherwise noted.

2. Amend § 17.12(h) by adding the following, in alphabetical order under the families indicated, to the List of Endangered and Threatened Plants:

§ 17.12 Endangered and threatened plants.

* * * * *

(h) * * *

Species		Historic range	Status	When listed	Critical habitat	Special rules
Scientific name	Common name					
*	*	*	*	*	*	
Asteraceae—Aster family:						
*	*	*	*	*	*	
Dubautia latifolia	None	U.S.A. (HI)	E	464	NA	NA
*	*	*	*	*	*	
Euphorbiaceae—Spurge family:						
*	*	*	*	*	*	
Chamaesyce halemanui	None	U.S.A. (HI)	E	464	NA	NA
*	*	*	*	*	*	
Flacourtiaceae—Flacourtia family:						
*	*	*		*	*	
Xylosma crenatum	None	U.S.A. (HI)	E	464	NA	NA
*	*	*	*	*	*	
Lamiaceae—Mint family:						
*	*	*	*	*	*	

Species						
Scientific name	Common name	Historic range	Status	When listed	Critical habitat	Special rules
Stenogyne campanulata	None	U.S.A. (HI)	E	484	NA	NA
Poaceae—Grass family:						
Poa sandvicensis	Hawaiian bluegrass	U.S.A. (HI)	E	484	NA	NA
Poa siphonoglossa	None	U.S.A. (HI)	E	484	NA	NA

Dated: April 28, 1992.

Richard N. Smith,

Acting Director, Fish and Wildlife Service.

[FR Doc. 92-10984 Filed 5-12-92; 8:45 am]

BILLING CODE 4310-55-M

50 CFR Part 17

RIN 1018-AB52

Endangered and Threatened Wildlife and Plants; Determination of Endangered Status for Geranium Arboreum (Hawaiian Red-Flowered Geranium)

AGENCY: Fish and Wildlife Service, Interior.

ACTION: Final rule.

SUMMARY: The U.S. Fish and Wildlife Service (Service) determines a plant, *Geranium arboreum* (Hawaiian red-flowered geranium), to be endangered pursuant to the Endangered Species Act of 1973, as amended (Act). This species grows primarily in gulches between 5,000 to 7,000 feet (ft) (1,525 to 2,135 meters (m)) in elevation on the northern and western slopes of Haleakala, east Maui, Hawaiian Islands. The greatest immediate threats to the survival of this species are habitat disturbance by domestic and feral cattle and feral pigs, and competition from naturalized, exotic vegetation. This rule implements the protection and recovery provisions provided by the Act for this species.

EFFECTIVE DATE: June 12, 1992.

ADDRESSES: The complete file for this rule is available for public inspection, by appointment, during normal business hours at the U.S. Fish and Wildlife Service, 300 Ala Moana Boulevard, room 6307, Honolulu, Hawaii 96813.

FOR FURTHER INFORMATION CONTACT: Derral R. Herbst, at the above address (808/541-2749 or FTS 551-2749).

SUPPLEMENTARY INFORMATION:

Background

Geranium arboreum was first collected by Charles Pickering and William Brackenridge of the U.S. Exploring Expedition on Haleakala, Maui, on February 26, 1841 (Funk 1988a, 1988b). Asa Gray was given the task to prepare a report on all of the foreign plants collected by the expedition. Of the two volumes he produced concerning these specimens, only one was published, and in it *Geranium arboreum* was described as a new species (Gray 1854). In 1958, Degener and Greenwell changed the plant's name to *Neurophyllodes arboreum;* however, Gray's placement of the plant in *Geranium* is accepted by other botanists (Funk 1988b). Today about 300 individuals are known (Funk 1988b); these are found chiefly in the Polipoli Springs and Hosmer Grove—Puu Nianiau areas on the western and northwestern slopes, respectively, of Haleakala. About 250 plants occur on State-owned land within the Xula Forest Reserve, the remainder are mostly in Haleakala National Park, The Nature Conservancy's Waikamoi Preserve, or on Haleakala, Kaonoulu, or Erehwon Ranch lands (Funk 1982, 1988b; Hawaiian Heritage Program 1991).

Geranium arboreum, in the Geranium family, is a much branched, spreading, woody shrub about 6 to 12 ft (1.8 to 3.7 m) tall. The leaves are thin, bright green, broad and rounded at the base, tapering toward the end, and about 1 to 1.5 inches (in) (2.5 to 3.8 centimeters (cm)) long. Each leaf has five to nine main veins, and has edges notched with tooth-like projections. The flower petals are red, about 1 to 1.5 in (2.5 to 3.8 cm) long; the upper three petals are erect, the lower two reflexed, causing the flower to appear curved (Wagner *et al.* 1990). Due to this flower shape, this species is the only one in the genus which appears to be adapted to bird pollination (Funk 1982, 1988b).

The original range and abundance of the species is unknown; however, late 19th and early 20th century collections indicate that it once grew on the southern slopes of Haleakala, and that its distribution on the northern slopes extended beyond its presently known range. Today, isolated populations of *Geranium arboreum* grow in steep, narrow canyons on the north and west outer slopes of Haleakala between 5,000 and 7,000 ft (1,525 to 2,135 m) in elevation in an area that is roughly 9 miles (mi) (14 kilometers (km)) in length, and 0.15 mi (0.25 km) in width. The environment of these gulches is damp, shaded part of the day, and protected, contrasting with the generally drier climate of the surrounding area. The moist habitat apparently is due to fog drip and run-off. The plants appear to obtain a significant amount of their water requirements by "combing" moisture out of the drifting fog (Funk 1982). Vegetation in the ravines is often quite dense, and consists of mostly medium-sized woody shrubs, introduced grasses and weeds, and mixed ferns (Funk 1982). *Geranium arboreum* occurs in small isolated populations in the gulches and is a minor component of the vegetation. The habitat of nearby and surrounding areas is subalpine dry forest or mesic scrub land; a few *Geranium arboreum* individuals grow near areas that have been converted to agricultural uses such as pasture land or experimental tree plots.

The greatest immediate threat to the survival of this species is the encroachment and competition from naturalized, exotic vegetation, chiefly grasses and trees. Soil disturbances, caused by trampling of cattle and rooting by feral pigs, also are a major threat as they destroy plants and facilitate the encroachment of competing species of naturalized plants. Other less important threats include browsing by cattle; fires; and, in the Polipoli Springs area, pollen from exotic pine trees. At certain times of the year, pine pollen completely cover the stigmas of the geraniums, precluding any fertilization by its own species (Funk 1982, 1988b). The small number of individual plants increases the potential for extinction from stochastic events, and the limited gene pool may depress reproductive vigor.

Federal action on this plant began as a result of section 12 of the Act, which directed the Secretary of the Smithsonian Institution to prepare a report on plants considered to be endangered, threatened, or extinct in the United States. This report, designated as

House Document No. 94–51, was presented to Congress on January 9, 1975. In that document, *Geranium arboreum* was considered endangered. On July 1, 1975, the Service published a notice in the **Federal Register** (40 FR 27823) of its acceptance of the Smithsonian report as a petition within the context of section 4(c)(2) (now section 4(b)(3)) of the Act, and giving notice of its intention to review the status of the plant taxa named therein. As a result of that review, on June 16, 1976, the Service published a proposed rule in the **Federal Register** (41 FR 24523) to determine endangered status pursuant to section 4 of the Act for approximately 1,700 vascular plant species, including *Geranium arboreum*. The list of 1,700 plant taxa was assembled on the basis of comments and data received by the Smithsonian Institution and the Service in response to House Document No. 94–51 and the July 1, 1975, **Federal Register** publication.

General comments received in response to the 1976 proposal are summarized in an April 26, 1978, **Federal Register** publication (43 FR 17909). In 1978, amendments to the Act required all proposals over two years old be withdrawn. A 1-year grace period was given to proposals already over 2 years old. On December 10, 1979, the Service published a notice in the **Federal Register** (44 FR 70796) withdrawing the portion of the June 16, 1976, proposal that had not been made final, along with four other proposals that had expired. The Service published an updated notice of review for plants on December 15, 1980 (45 FR 82479), September 27, 1985 (50 FR 39525), and February 21, 1990 (55 FR 6183). In these notices, *Geranium arboreum* was treated as a category 1 candidate for Federal listing. Category 1 taxa are those for which the Service has on file substantial information on biological vulnerability and threats to support preparation of listing proposals.

Section 4(b)(3)(B) of the Act requires the Secretary to make findings on certain pending petitions within 12 months of their receipt. Section 2(b)(1) of the 1982 amendments further requires all petitions pending on October 13, 1982, be treated as having been newly submitted on that date. The latter was the case of *Geranium arboreum* because the Service had accepted the 1975 Smithsonian report as a petition. On October 13, 1983, the Service found that the petitioned listing of *Geranium arboreum* was warranted, but precluded by other pending listing actions, in accordance with section 4(b)(3)(B)(iii) of the Act; notification of this finding was published in the **Federal Register** on January 20, 1984 (49 FR 2485). Such a finding requires the petition to be recycled, pursuant to section 4(b)(3)(C)(i) of the Act. The finding was reviewed in October of 1984, 1985, 1986, 1987, 1988, 1989, and 1990.

On January 23, 1991, the Service published in the **Federal Register** (56 FR 2490) a proposal to list *Geranium arboreum* as endangered. This proposal was based primarily on information supplied by a status report and a doctoral dissertation by Evangeline Funk, and observations by botanists. The Service now determines *Geranium arboreum* to be endangered with the publication of this rule.

Summary of Comments and Recommendations

In the January 23, 1991, proposed rule and associated notifications, all interested parties were requested to submit factual reports or information relevant to a final decision on the listing proposal. The public comment period ended on March 25, 1991. Appropriate State agencies, county governments, Federal agencies, scientific organizations, and other interested parties were contacted and requested to comment. A newspaper notice inviting general public comment was published in the "Maui News" on February 1, 1991. Two letters of comment were received, one from The Nature Conservancy, the other from the National Park Service; both supported listing the species. Additional information included in the Park Service's letter has been incorporated into this rule.

Summary of Factors Affecting the Species

After a thorough review and consideration of all information available, the Service has determined that *Geranium arboreum* should be classified as an endangered species. Procedures found at section 4 of the Endangered Species Act (16 U.S.C. 1533 *et seq.*) and regulations (50 CFR part 424) promulgated to implement the listing provisions of the Act were followed. A species may be determined to be an endangered or threatened species due to one or more of the five factors described in section 4(a)(1). The five factors and their application to *Geranium arboreum* A. Gray (Hawaiian red-flowered geranium) are as follows:

A. The Present or Threatened Destruction, Modification, or Curtailment of its Habitat or Range

It is likely that the entire area supporting *Geranium arboreum* has been grazed by domestic or feral cattle. Ground disturbing activities associated with grazing by cattle or rooting by pigs have degraded the habitat that supports *Geranium arboreum* and may be responsible for some of the reduction in the species' range. When pigs forage, their rooting activity disrupts several inches of the soil surface and uproots plants, especially seedlings. The ground disturbance associated with the activities of cattle and pigs results in the increased erosion of the *Geranium* habitat, and favors the rapid invasion by exotic species. Probably the single greatest threat to the remaining *Geranium arboreum* is competition from naturalized, exotic plants, particularly grasses such as Yorkshire fog (*Holcus lanatus*) and, to a lesser extent, naturalized trees such as wattle (*Acacia mernsii*) and firetree (*Myrica faya*); these exotic species invade and become established in disturbed areas. Introduced grasses occupy sites where *Geranium arboreum* seedlings normally would grow; the grasses form dense sod-like mats, and prevent seedlings of other species from becoming established (Funk 1988b). Fires represent an additional potential threat to the species and its habitat; a fire in the Polipoli Springs area in 1984 destroyed four *Geranium* plants.

B. Overutilization for Commercial, Recreational, Scientific, or Educational Purposes

Not known to be a factor; nowever, unrestricted scientific collecting or excessive visits resulting from increased publicity could seriously affect the species. *Geranium arboreum* is attractive and could become the subject of increased collection in the future.

C. Disease or Predation

Occasional browsing by cattle has been observed, but it is infrequent and is not considered a major threat. Recently, a naturalized population of rabbits was discovered in the northwest corner of Haleakala National Park, approximately 1 mi (2 km) from a population of *Geranium arboreum*. Although at present the rabbits are selective in their foraging, favoring the shoots and bark of mamane (*Sophora chrysophylla*) and grasses, in the predator-poor upper elevations of Haleakala, a rapid increase in the rabbit population could adversely impact the entire vegetation of the area.

D. The Inadequacy of Existing Regulatory Mechanisms

Most of the known extant *Geranium arboreum* plants grow in the Polipoli Springs area which is within the

boundaries of the State-owned Kula Forest Reserve. State regulations prohibit the removal, destruction, or damage of plants found on these lands. However, due to limited personnel, the regulations are difficult to enforce. There are no State laws or existing regulatory mechanisms at the present time to protect or prevent further decline of this plant on private land. However, Federal listing automatically invokes listing under Hawaii State law, which prohibits taking and encourages conservation by State government agencies. Hawaii's Endangered Species Act (HRS, sect. 195D–4(a)) states, "Any species of wildlife or plant that has been determined to be an endangered species pursuant to the (Federal) Endangered Species Act shall be deemed to be an endangered species under the provisions of this chapter * * *." Further, the State may enter into agreements with Federal agencies to administer and manage any area required for the conservation, management, enhancement, or protection of endangered species (section 195D–5(c)). Funds for these activities could be made available under section 6 of the Act (State Cooperative Agreements). Listing of this plant therefore reinforces and supplements the protection available to the species under State law. The Federal Act also will offer additional protection to the species, because it is a violation of the Act for any person to remove, cut, dig up, damage, or destroy an endangered plant in an area not under Federal jurisdiction in knowing violation of any State law or regulation or in the course of any violation of a State criminal trespass law.

A very small proportion of the individuals of *Geranium arboreum* occur on land managed by the National Park Service. Although the Park Service does offer protective management to sensitive resources, the small percentage of plants that potentially receive this management does not substantially reduce the degree of threat faced by the species.

E. Other Natural or Manmade Factors Affecting its Continued Existence

A large part of the annual reproductive effort is effectively lost when pollen released from pine trees in the Polipoli forestry plantings completely covers the stigmas of the *Geranium* growing in that area. The windborne pine pollen forms a mechanical barrier, blocking the reception of *Geranium* pollen, thus reducing the annual reproductive success of this species (Funk 1986b). However, as *Geranium arboreum* has a longer flowering period than do the introduced pine trees, some pollination and resultant seed production does occur.

Approximately 300 individuals remain in about 21 sites, each of which contains between 1 and 25 individuals. The small number of extant plants in these populations makes the species more vulnerable to certain threats. The limited gene pool may result in depressed reproductive vigor, although there is no evidence that there is such a problem today, or a single human-caused or natural environmental disturbance could destroy a significant percentage of the known extant individual plants.

The Service has carefully assessed the best scientific and commercial information available regarding the past, present, and future threats faced by this species in determining to issue this final rule. Based on this evaluation, the preferred action is to list *Geranium arboreum* as endangered. Only about 300 individuals remain in the wild, and these face threats from habitat degradation and competition from exotic species of plants, as well as other lesser factors. Because this species is in danger of extinction throughout all or a significant portion of its range, it fits the definition of endangered as defined in the Act. Critical habitat is not being designated for this plant for the reasons discussed in the "Critical Habitat" section of this rule.

Critical Habitat

Section 4(a)(3) of the Act, as amended, requires that to the maximum extent prudent and determinable, the Secretary designate critical habitat at the time a species is determined to be endangered or threatened. The Service finds that designation of critical habitat is not presently prudent for this species. Such a determination would result in no known benefit to the species. All but a few individuals grow on Federal or State land; government agencies and the few private land owners can be alerted to the presence of the plant without the publication of critical habitat descriptions and maps. The publication of descriptions and maps required when critical habitat is designated would increase the degree of threats to this plant from take or vandalism and, therefore, could contribute to its decline and increase enforcement problems. The listing of this species as endangered publicizes the rarity of the plant and, thus, can make it more desirable to researchers, curiosity seekers, or collectors of rare plants. All involved parties and major land owners have been notified of the general location and importance of protecting the habitat of this species. Protection of the habitat will be addressed through the recovery process and through the section 7 consultation process. Therefore, the Service finds that designation of critical habitat for *Geranium arboreum* is not prudent at this time, because such designation would increase the degree of threat from vandalism, collecting, or other human activities and because it is unlikely to aid in the conservation of this species.

Available Conservation Measures

Conservation measures provided to species listed as endangered or threatened under the Endangered Species Act include recognition, recovery actions, requirements for Federal protection, and prohibitions against certain activities. Recognition through listing encourages and results in conservation actions by Federal, State, and private agencies, groups, and individuals. The Endangered Species Act provides for possible land acquisition and cooperation with the States and requires that recovery actions be carried out for all listed species. The protection required of Federal agencies and the prohibitions against certain activities involving listed plants are discussed, in part, below.

Section 7(a) of the Act, as amended, requires Federal agencies to evaluate their actions with respect to any species that is proposed or listed as endangered or threatened and with respect to its critical habitat, if any is being designated. Regulations implementing this interagency cooperation provision of the Act are codified at 50 CFR part 402. Section 7(a)(2) of the Act requires Federal agencies to insure that activities they authorize, fund, or carry out are not likely to jeopardize the continued existence of such a species or to destroy or adversely modify its critical habitat. If a Federal action may affect a listed species or its critical habitat, the responsible Federal agency must enter into formal consultation with the Service. Although some individuals occur on land managed by the National Park Service, it is unlikely that actions by this agency would adversely affect this species.

The Act and its implementing regulations found at 50 CFR 17.61, 17.62, and 17.63 for endangered species set forth a series of general prohibitions and exceptions that apply to all endangered plants. With respect to *Geranium arboreum* all trade prohibitions of section 9(a)(2) of the Act, implemented by 50 CFR 17.61 apply. These prohibitions, in part, make it illegal with respect to any endangered plant, for any person subject to the jurisdiction of the

United States to import or export; transport in interstate or foreign commerce in the course of a commercial activity; sell or offer for sale this species in interstate or foreign commerce; or to remove and reduce to possession any such species from areas under Federal jurisdiction; maliciously damage or destroy any such species on any area under Federal jurisdiction; or remove, cut, dig up, damage or destroy endangered plants on any other area in knowing violation of any State law or regulation or in the course of any violation of a State criminal trespass law. Certain exceptions apply to agents of the Service and State conservation agencies. The Act and 50 CFR 17.62 and 17.63 also provide for the issuance of permits to carry out otherwise prohibited activities involving endangered plant species under certain circumstances. It is anticipated that few trade permits would ever be sought or issued because the species is not common in cultivation or in the wild. Requests for copies of the regulations on plants and inquiries regarding them may be addressed to the Office of Management Authority, U.S. Fish and Wildlife Service, 4401 North Fairfax Drive, room 432–ARLSQ, Arlington, Virginia 22203–3507 (703/358–2104 or FTS 921–2104; FAX 703/358–2281).

National Environmental Policy Act

The Fish and Wildlife Service has determined that an Environmental Assessment or Environmental Impact Statement, as defined under the authority of the National Environmental Policy Act of 1969, need not be prepared in connection with regulations adopted pursuant to section 4(a) of the Endangered Species Act of 1973, as amended. A notice outlining the Service's reasons for this determination was published in the **Federal Register** on October 25, 1983 (48 FR 49244).

References Cited

Funk, E.J. 1982. Unpublished status survey of *Geranium arboreum* A. Gray (Hawaiian red-flowered geranium). U.S. Fish and Wildlife Service. 34 pp.

Funk, E.J. 1988a. The notes of William Brackenridge made during his Sandwich Islands sojourn 1840–1841. Hawaiian Botanical Society Newsletter 27(1): 3–35.

Funk, E.J. 1988b. Distribution, population structure and reproductive biology of a narrow endemic species: *Geranium arboreum* A. Gray. Doctoral dissertation, University of Hawaii. 200 pp.

Gray, A. 1854. United States Exploring Expedition during the years 1838, 1839, 1840, 1841, 1842, under the command of Charles Wilkes, U.S.N. Botany, vol. 15, Phanerogamia, part 1. C. Sherman, Philadelphia. 315 pp.

Hawaii Heritage Program. 1991. Element Occurrence Record for *Geranium arboreum*, PDGER02010.006, dated June 5, 1991, Honolulu. Unpubl. 2 pp.

Wagner, W.L., D.R. Herbst, and S.H. Sohmer. 1990. Manual of the flowering plants of Hawaii. Bishop Mus. Spec. Publ. 83. University of Hawaii Press and Bishop Museum Press, Honolulu. 1853 pp.

Author

The primary author of this final rule is Dr. Derral R. Herbst, Fish and Wildlife Enhancement, Pacific Islands Office, U.S. Fish and Wildlife Service, 300 Ala Moana Boulevard, room 6307, P.O. Box 50167, Honolulu, Hawaii 96850 (808/541–2749 or FTS 551–2749).

List of Subjects in 50 CFR part 17

Endangered and threatened species, Exports, Imports, Reporting and recordkeeping requirements, and Transportation.

Regulation Promulgation

PART 17—[AMENDED]

Accordingly, part 17, subchapter B of chapter I, title 50 of the Code of Federal Regulations, is amended as set forth below:

1. The authority citation for part 17 continues to read as follows:

Authority: 16 U.S.C. 1361–1407; 16 U.S.C. 1531–1544; 16 U.S.C. 4201–4245; Pub. L. 99–625, 100 Stat. 3500; unless otherwise noted.

2. Amend § 17.12(h) by adding a new family "Geraniaceae—Geranium family," in alphabetical order, to the List of Endangered and Threatened Plants:

§ 17.12 Endangered and threatened plants.

* * * * *

(h) * * *

Species		Historic range	Status	When listed	Critical habitat	Special rules
Scientific name	Common name					
*	*	*	*	*	*	
Geraniaceae—Geranium family:						
Geranium arboreum	Hawaiian red-flowered geranium	U.S.A. (HI)	E	465	NA	NA
*	*	*	*	*	*	

Dated: May 1, 1992.

Bruce Blanchard,

Acting Director, Fish and Wildlife Service.

[FR Doc. 92–10985 Filed 5–12–92; 8:45 am]

BILLING CODE 4310–55–M

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50 CFR Part 17

RIN 1018—AB52

Endangered and Threatened Wildlife and Plants; Determination of Endangered Status for Stenogyne kanehoana (No Common Name), a Hawaiian plant

AGENCY: Fish and Wildlife Service, Interior.

ACTION: Final rule.

SUMMARY: The U.S. Fish and Wildlife Service (Service) determines a plant, *Stenogyne kanehoana*, to be endangered pursuant to the Endangered Species Act of 1973, as amended (Act). This species is known only from one small population located on the island of Oahu, Hawaii. The greatest immediate threat to the survival of this species is the encroachment and competition from naturalized, exotic vegetation. The extremely small size of the population also is a considerable threat as the limited gene pool may repress reproductive vigor, or a single environmental disturbance could destroy the only known remaining individuals. This rule implements the protection and recovery provisions afforded by the Act for this plant.

EFFECTIVE DATE: June 12, 1992.

ADDRESSES: The complete file for this rule is available for public inspection, by appointment, during normal business hours at the U.S. Fish and Wildlife Service, 300 Ala Moana Boulevard, room 6307, Honolulu, Hawaii 96813.

FOR FURTHER INFORMATION CONTACT: Derral R. Herbst, at the above address (808/541–2749 or FTS 551–2749).

SUPPLEMENTARY INFORMATION:

Background

Stenogyne kanehoana was first collected on the east ridge of Puu Kanehoa, Waianae Mountains by Harold St. John in 1934. Otto Degener collected it in the same area in 1939, and, along with Earl Sherff, described the taxon (Sherff 1941), naming it after the type locality. All subsequent collections have been from the same area which is near the summit of the ridge connecting Puu Kanehoa with Puu Hapapa to the north and Puu Kaua to the south, a distance totaling approximately 1.75 miles (2.8 kilometers). Today one population consisting of two to four plants remains under a canopy of mesic forest trees on a ridge leading to the summit of Puu Kanehoa (Center for Plant Conservation (CPC) 1989; Hawaii Heritage Program (HHP) 1988, 1989a, 1989b; Hawaii Plant Conservation Center (HPCC) 1990; Obata 1977; St. John 1981; Joel Lau, HHP, pers. comm., 1989; John Obata, HPCC, pers. comm., 1989; Steven Perlman, HPCC, pers. comm., 1989; Steven Weller, University of California at Irvine, pers. comm., 1989). The plants occur on privately-owned land.

Stenogyne kanehoana is a scandent vine in the mint family (Lamiaceae) with stems weakly 4-angled, hairy, and 3 to 6 feet (1 to 2 meters) long. The leaves are oppositely arranged and are narrowly ovate to oblong-ovate, thin but densely hairy, about 4 inches (in) (10 centimeters (cm)) long and 1.5 in (3.5 cm) wide. The flowers are in clusters of 3 to 6 per leaf axil; the petals are fused into a strongly curved tube about 1 to 1.5 in (2.7 to 4.2 cm) long, white or pale yellow with short pink corolla lobes. The fruit consists of 4 fleshy black nutlets (Weller and Sakai 1990). *Stenogyne kanehoana* is distinguished from the only other member of the genus occurring on Oahu, *S. kaalae*, primarily by the size and color of its flowers. The flowers of *S. kanehoana* are large, white to yellow, and tipped in pink, while those of *S. kaalae* are small and deep purple. *Stenogyne kanehoana* occurs on an open ridge top in mesic forest. Associated species include o'hia (*Metrosideros polymorpha*), koa (*Acacia koa*), 'ie'ie (*Freycinetia arborea*), and uluhe (*Dicranopteris linearis*).

The greatest immediate threat to the survival of this species is habitat degradation and competition for space, water, light, and nutrients by naturalized, alien vegetation (HPCC 1990; Obata, pers. comm., as cited by Weller and Sakai 1990). The extremely small number of individual plants and their restricted distribution increases the potential for extinction from stochastic events. The limited gene pool may depress reproductive vigor, or a single man-caused or natural environmental disturbance could destroy all known individuals. Other potential threats which have been suggested include fire and deforestation (St. John 1981), but, at present, these probably are not serious threats to the species.

Federal government action on this species began with the publication by the Service of an updated notice of review for plants on December 15, 1980 (45 FR 82479). *Stenogyne kanehoana* was included in that publication as a category 1 candidate for Federal listing, meaning that the Service has on file substantial information on biological vulnerability and threats to support preparation of a listing proposal. The species also was included as a category 1 candidate species in the September 27, 1985 (50 FR 39525), and February 21, 1990 (55 FR 6183), notices of review. On January 23, 1991, the Service published in the **Federal Register** (56 FR 2493) a proposal to list *Stenogyne kanehoana* as endangered. This proposal was based primarily on information supplied by the Hawaii Heritage Program, the Center for Plant Conservation, and the observations of botanists and naturalists. The Service now determines *Stenogyne kanehoana* to be an endangered species with the publication of this rule.

Summary of Comments and Recommendations

In the January 23, 1991, proposed rule and associated notifications, all interested parties were requested to submit factual reports or information relevant to a final listing decision. The public comment period ended on March 25, 1991. Appropriate State agencies, county and city governments, Federal agencies, scientific organizations, and other interested parties were contacted and requested to comment. A newspaper notice inviting general public comment was published in "The Honolulu Advertiser" on February 2, 1991. Two letters of comment were received, both from conservation organizations which supported the listing of the taxon.

Summary of Factors Affecting the Species

After a thorough review and consideration of all information available, the Service has determined that *Stenogyne kanehoana* should be classified as an endangered species. Procedures found at section 4 of the Endangered Species Act (16 U.S.C. 1531 *et seq.*) and regulations (50 CFR part 424) promulgated to implement the listing provisions of the Act were followed. A species may be determined to be an endangered or threatened species due to one or more of the five factors described in section 4(a)(1). The five factors and their application to *Stenogyne kanehoana* Degener and Sherff (no common name) are as follows:

A. The Present or Threatened Destruction, Modification, or Curtailment of its Habitat or Range

Encroachment and competition from naturalized, exotic plants probably is the single greatest threat to this species (HPCC 1990). Koster's curse (*Clidemia hirta*) has recently invaded the *Stenogyne kanehoana* habitat; this aggressive, rapidly spreading bush probably is the single greatest threat to the species (J. Lau, pers. comm., 1989). This species forms a dense understory, shading other plants and hindering plant regeneration. Lantana (*Lantana camara*) also is common in the area along with some Christmas berry (*Schinus terebinthifolius*) (S. Weller, pers. comm., 1989). Christmas berry is a fast-growing alien plant that is able to form dense thickets, displacing other plants. It also may release a chemical that inhibits the growth of other species (Smith 1985). All of the above three species have invaded former native habitat in Hawaii to the exclusion or detriment of the native vegetation. Fires and deforestation have been suggested as potential threats to the *Stenogyne*, but these probably are not serious threats at the present.

B. Overutilization for Commercial, Recreational, Scientific, or Educational Purposes

Overutilization is not known to be a factor, but unrestricted scientific collecting or excessive visits by individuals interested in seeing rare plants could result from increased publicity and could seriously affect the species. Disturbance to the area by trampling would promote greater ingress by competing exotic species.

C. Disease or Predation

Disease or predation are not known to be factors threatening this species.

D. The Inadequacy of Existing Regulatory Mechanisms

There are no State laws or existing regulatory mechanisms at the present time to protect *Stenogyne kanehoana* or prevent its further decline. However, Hawaii's Endangered Species Act (HRS, section 195D–4(a)) states that "Any species of wildlife or plant that has been determined to be an endangered species

pursuant to the Endangered Species Act (of 1973) shall be deemed to be an endangered species under the provisions of this chapter * * *." Further, the State may enter into agreements with Federal agencies to administer and manage any area required for the conservation, management, enhancement, or protection of endangered species (section 195D–5(c)). Funds for these activities could be made available under section 6 of the Federal Act (State Cooperative Agreements). Listing of this species will therefore reinforce and supplement the protection available to the plant under State law. The Federal Act also will offer additional protection to the species, because it is a violation of the Act for any person to remove, cut, dig up, damage, or destroy an endangered plant in an area not under Federal jurisdiction in knowing violation of State law or regulation or in the course of any violation of a State criminal trespass law.

E. Other Natural or Manmade Factors Affecting its Continued Existence

The small number of individual plants of this species increases the potential for extinction from stochastic events. The limited gene pool may depress reproductive vigor, or a single man-caused or natural environmental disturbance could destroy the only known extant population of the species. It has been stated that the species is not setting seed (CPC 1989, HPCC 1990) or at least is not successfully reproducing (HHP 1989).

The Service has carefully assessed the best scientific and commercial information available regarding the past, present, and future threats faced by this species in determining to issue this final rule. Based on this evaluation, the preferred action is to list *Stenogyne kanehoana* as endangered. Only two to four individuals remain in the wild, and these face threats from the encroachment and competition from exotic species of plants, especially lantana and Koster's curse, two particularly aggressive weeds. Because this taxon is in danger of extinction throughout all or a significant portion of its range, it fits the definition of endangered as defined by the Act. Critical Habitat is not being designated for this species for reasons discussed in the "Critical Habitat" section of this rule.

Critical Habitat

Section 4(a)(3) of the Act, as amended, requires that to the maximum extent prudent and determinable, the Secretary designate critical habitat at the time the species is determined to be endangered or threatened. The Service finds that designation of critical habitat is not presently prudent for this species. Such a determination would result in no known benefit to the species. The few known individuals are on privately-owned land zoned as conservation land; all involved parties and the landowner have been notified of the general location and importance of protecting this species' habitat. The publication of descriptions and maps required when critical habitat is designated would make *Stenogyne kanehoana* more vulnerable and increase enforcement problems. It would increase the degree of threat to this species from possible take or vandalism because *Stenogyne kanehoana* is an attractive plant and live specimens would be of interest to curiosity seekers or collectors of rare plants. Protection of the species' habitat will be addressed through the recovery process. Therefore, the Service finds that designation of critical habitat for this species is not prudent at this time, because such designation would increase the degree of threat from vandalism, collecting, or other human activities and because it is unlikely to aid in the conservation of the species.

Available Conservation Measures

Conservation measures provided to species listed as endangered or threatened under the Endangered Species Act include recognition, recovery actions, requirements for Federal protection, and prohibitions against certain activities. Recognition through listing encourages and results in conservation actions by Federal, State, and private agencies, groups, and individuals. The Endangered Species Act provides for possible land acquisition and cooperation with the State and requires that recovery actions be carried out for all listed species. The protection required of Federal agencies and the prohibitions against certain activities involving listed plants are discussed, in part, below.

Section 7(a) of the Act, as amended, requires Federal agencies to evaluate their actions with respect to any species that is proposed or listed as endangered or threatened and with respect to its critical habitat, if any is being designated. Regulations implementing this interagency cooperation provision of the Act are codified at 50 CFR part 402. Section 7(a)(2) of the Act requires Federal agencies to insure that activities they authorize, fund, or carry out are not likely to jeopardize the continued existence of such a species or destroy or adversely modify its critical habitat. If a Federal action may affect a listed species or its critical habitat, the responsible Federal agency must enter into formal consultation with the Service. No Federal involvement with *Stenogyne kanehoana* is anticipated.

The Act and its implementing regulations found at 50 CFR 17.61, 17.62, and 17.63 set forth a series of general prohibitions and exceptions that apply to all engangered plants. With respect to *Stenogyne kanehoana*, all trade prohibitions of section 9(a)(2) of the Act, implemented by 50 CFR 17.61 apply. These prohibitions, in part, make it illegal with respect to any endangered plant, for any person subject to the jurisdiction of the United States to import or export; transport in interstate or foreign commerce in the course of a commercial activity; sell or offer for sale this species in interstate or foreign commerce; or to remove and reduce to possession the species from areas under Federal jurisdiction; maliciously damage or destroy any such species on any area under Federal jurisdiction; or remove, cut, dig up, damage, or destroy endangered plants on any other area in knowing violation of any State law or regulation or in the course of any violation of a State criminal trespass law. Certain exceptions apply to agents of the Service and State conservation agencies. The Act and 50 CFR 17.62 and 17.63 also provide for the issuance of permits to carry out otherwise prohibited activities involving endangered plant species under certain circumstances. It is anticipated that few trade permits would ever be sought or issued because the species is not common in cultivation or in the wild. Requests for copies of the regulations on plants and inquiries regarding them may be addressed to the Office of Management Authority, U.S. Fish and Wildlife Service, 4401 North Fairfax Drive, room 432–ARLSQ, Arlington, Virginia 22203–3507 (703/358–2104 or FTS 921–2104; FAX 703/358–2281).

National Environmental Policy Act

The Fish and Wildlife Service has determined that an Environmental Assessment or Environmental Impact Statement, as defined under the authority of the National Environmental Policy Act of 1969, need not be prepared in connection with regulations adopted pursuant to section 4(a) of the Endangered Species Act of 1973, as amended. A notice outlining the Service's reasons for this determination was published in the **Federal Register** on October 25, 1983 (48 FR 49244).

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Author

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List of Subjects in 50 CFR Part 17

Endangered and threatened species, Exports, Imports, Reporting and recordkeeping requirements, and Transportation.

Regulation Promulgation

Accordingly, part 17, subchapter B of chapter I, title 50 of the Code of Federal Regulations, is amended as set forth below:

PART 17—[AMENDED]

1. The authority citation for part 17 continues to read as follows:

Authority: 16 U.S.C. 1361–1407; 16 U.S.C. 1531–1544; 16 U.S.C. 4201–4245; Pub. L. 99–625, 100 Stat. 3500; unless otherwise noted.

2. Amend § 17.12(h) by adding the following, in alphabetical order under the family Lamiaceae, to the List of Endangered and Threatened Plants:

§ 17.12 Endangered and threatened plants.

* * * * *

(h) * * *

Species		Historic range	Status	When listed	Critical habitat	Special rules
Scientific name	Common name					
*	*	*	*	*	*	
Lamiaceae—Mint family:						
*	*	*	*	*	*	
Stenogyne kanehoana	None	U.S.A. (HI)	E	466	NA	NA
*	*	*	*	*	*	

Dated: April 30, 1992.

Bruce Blanchard,

Acting Director, Fish and Wildlife Service.

[FR Doc. 92–10986 Filed 5–12–92; 8:45 am]

BILLING CODE 4310–55–M